Leveraging the Web for Services at Y!™

Mark Nottingham
<mnot@yahoo-inc.com>

Y! Calendar

Y! Mexico

Y! Shopping

Y! Sports Y! China

Y! Local Y! Auctions Y! Personal Finance

Y! Travel Y! Messenger **Upcoming**

Y! France Y! Small Business **Bix**

Y! Mail Y! Brazil **del.icio.us**

Y! Germany Y! Spain Y! Tech

Y! Korea Y! Health **Flickr**

Y! UK Y! Movies Y! India Y! Food

Y! Australia Broadcast.com **HotJobs** Y! Podcasts

Yahooligans! Y! Italy Y! Argentina **Inktomi** Y! Video

Y! Classifieds Y! Entertainment **LAUNCH** **Overture** Y! Music

Y! Japan Y! Games Y! Photos Y! Maps **Kelkoo** Y! Go

Y! Y! Singapore **GeoCities** Y! Groups Y! Search Y! 360

92 **1994** **1996** **1998** **2000** **2002** **2004** **2006** 20

100,000
users

25 million
users

200 million
users

500 million
users

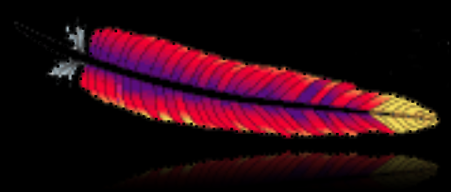
49 employees

11,400 employees

65 million
daily page views

1.3 billion
daily page views

4 billion
daily page views



Y! Auctions

Y! Mexico

Y! Messenger

Y! Germany

Y! India

Y! Entertainment

Y! China

Bix

Y! Travel

Inktomi

Upcoming

Y! Sports

Y! Korea

Y! Tech

Y! Small Business

Y! Brazil

Y! Mail

del.icio.us

Integration

Y! Japan

Y! Food

Y! UK

Flickr

Y! Go

Y!

Nightmare

Y! Spain

Y! 360

Overture

Y! France

Y! Health

Y! Music

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Kelkoo

Y! Classifieds

GeoCities

Y! Maps

Y! Podcasts

HotJobs

Y! Shopping

Y! Groups

Between Y! properties

With Y! partners

With Y! acquisitions

Within Y! over time

“Y!™ Scale”

Yahoo!

http://www.yahoo.com/

Inquisitor

$425,000 Loan for only $1,417/mo. Bad credit OK - **LendingTree**

YAHOO!

My Yahoo! | My Mail

Web | Images | Video | Local | Shopping | more

Search: Web Search

Y! Answers: Ask a question | Answer questions

the Web | UK only

Page Options

- **Autos**
- **Finance**
- **Games**
- **GeoCities**
- **Groups**
- **HotJobs** UPDATED!
- **Maps**
- **Movies**
- **Music**
- **My Web**
- **Personals**
- **Photos**
- **Real Estate**
- **Shopping**
- **Sports** UPDATED!
- **Tech**
- **Travel**
- **TV**
- **Yellow Pages**
- **Y! Telemundo** NEW!

More Yahoo! Services

Small Business

- **Get a Web Site**
- **Domain Names**
- **Sell Online**
- **Search Ads**

Featured Services

- **Downloads**
- **Health**
- **Kids**
- **Mobile**
- **Voice**
- **UK Broadband**
- **Y! International**

Featured | Entertainment | Sports | Life

Mar 15, 2007

The eyes of March?

Searchers want the scoop on March 15, but what word are they really looking for?

» Find out

- Check out the drama of TV's 'Rome'
- Y! Answers: How did Caesar die?

Beware the ides -- or is it 'eyes?' -- of March

Why America embraces March Madness

Some courting birds get help from a 'wingman'

Final 'Potter' set to break publishing records

» More Featured

In the News | World | Local | Video

As of 12:59 p.m.

- Al-Qaida No. 3 says he planned 9/11
- Republican says Gonzales should be fired
- World powers agree on new Iran sanctions
- 49 police officers killed in India
- French Resistance hero Lucie Aubrac dies at 94
- Debate continues over excavating Chinese imperial tombs
- Are consumers ready for an $11K cup of coffee?
- NCAA Tournament · MLB · NBA · NFL · NHL · Soccer

» More: **News** | **Popular** | **Business**

Markets: **Dow:** +0.5% **Nasdaq:** +0.9% Sponsored by: Scottrade

Marketplace

Why online degrees are hot:
1) Top schools 2) Drive own schedule 3) Employer may pay tuition - 4) Earn degree while working. Earn more.

What's your credit score 560? 678? 720? The average U.S. credit score is 675. See yours for $0. By Experian.

Attractive card for ugly credit. - A MasterCard for those with less than perfect credit.

Countrywide® - Refi to combine your 1st mortgage and other debt - Bad credit? Low refi rates. 4 of 5 approved.

Hi, **Mark** Sign Out

Mail | Messenger | Radio

Weather 49°F | Local | Horoscopes

Yahoo! Shopping

Buying Guides for Top Products

» Shop now

MP3 Players

Bed & Bath

Camcorders

Jewelry

Furniture

Laptops

Kitchen

TVs

Inside Yahoo! Answers

Queen Rania wants to know

What are you doing to empower women in your community?

» Answer Now

Pulse - What Yahoos Are Into

Top-Rated Indian Restaurants

- **Tabla** New York, NY
- **India's Oven** Los Angeles, CA
- **India House** Chicago, IL
- **Vik's Chaat...** San Francisco, CA
- **Tandoor Indian** Dallas, TX
- **Bombay Mahal** Boston, MA
- **Himalayas** Atlanta, GA
- **Gandhi India's** Las Vegas, NV

» Find More Curries and Tandooris

Popular Searches: Today's Overall Leaders

1 **NCAA Basketball**

5 **American Idol**

Media Group

Y! Music

Y! TV

Y! Personal Finance

Y! Kids

Y! Finance

Y! Movies

Y! Fantasy Sports

Y! Games

Y! Health

Y! Sports

Y! Astrology

Y! Wii

Y! Tech

Y! Food

Y! News

YAHOO! SPORTS

Yahoo! Sports

Today

NBA

Scoreboard	Courtside	Live
Chicago vs. Miami	0 0	7:30 ET
Atlanta vs. Orlando	0 0	7:30 ET
Phoenix vs. Milwaukee	0 0	8:00 ET
Philadelphia vs. Washington	0 0	8:00 ET
Dallas vs. Houston	0 0	8:30 ET
New Jersey vs. San Antonio	0 0	8:30 ET
Denver vs. LA Lakers	0 0	10:30 ET
Sacramento vs. Portland	0 0	10:30 ET

NHL

Scoreboard

NY Rangers vs. NY Islanders	0 0	7:00 ET
Ottawa vs. Philadelphia	0 0	7:00 ET
Washington vs. Atlanta	0 0	7:30 ET
Toronto vs. Calgary	0 0	9:00 ET

NCAA Hoops (M) Audio

Scoreboard

5 Cincinnati vs. St Louis	0 0	9:30 ET
7 Virginia vs. Georgia Tech	0 0	7:30 ET
9 Kentucky vs. Auburn	0 0	9:00 ET

Gruden packing his bags?

Gruden has refused to discuss his future in detail. (AP) more photos

Coach Jon Gruden will not sign a new contract with the Oakland Raiders **and plans to leave the team after next season at the latest**, his agent told several San Francisco Bay area newspapers. Gruden, a top candidate for the Tampa Bay Buccaneers' job, is in the lower half of the NFL coaching pay scale, with an annual salary of $1.2 million -- and his parents live in Tampa.

Top Stories

- Seles beats Venus Williams, moves into semifinal against Hingis - Tennis
- Gruden's agent says coach won't stay in Oakland past 2002 - NFL
- NBA announces new six-year, $4.6 billion deals with ESPN-ABC, TNT - NBA
- Tyson to fight Lewis in April - Boxing
- Former Winter Olympian Jack Shea dies after car crash - Olympics
- Burnitz, Rusch and Zeile move in three-team, 11-player trade - MLB
- Hornets 111, Knicks 68 - NBA
- X-rays show Warner has bruised ribs - NFL
- Mavericks 113, Nets 105 - NBA
- Duke is unanimous No. 1 again - NCAA Men's Basketball

Fantasy Sports
- Golf | Auto Racing
- College Hoops | **More**

User Survey
Help us provide better services for you!

headlines updated at Tue Jan 22 09:05:51 2002

Broadcast & Chat Events

- What's On Today -

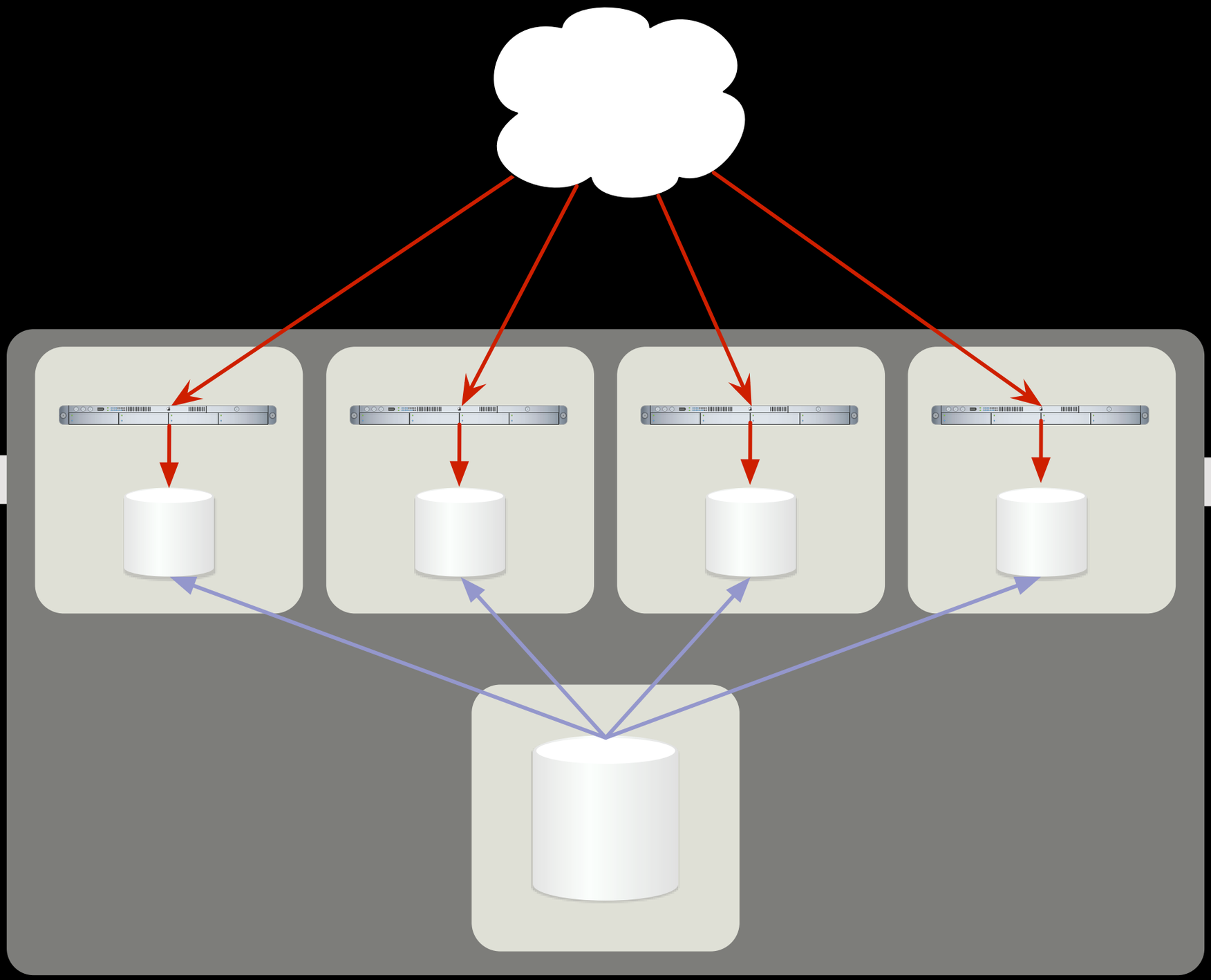
- **MLB Chat:** Rick Helling - 2 pm ET
- **Men's NCAA Hoops:** Michigan St at Iowa - 6:15 pm ET
- **NBA:** Philadelphia at Washington - 7 pm ET
- **NCAA Hockey:** Brown at Providence - 7 pm ET

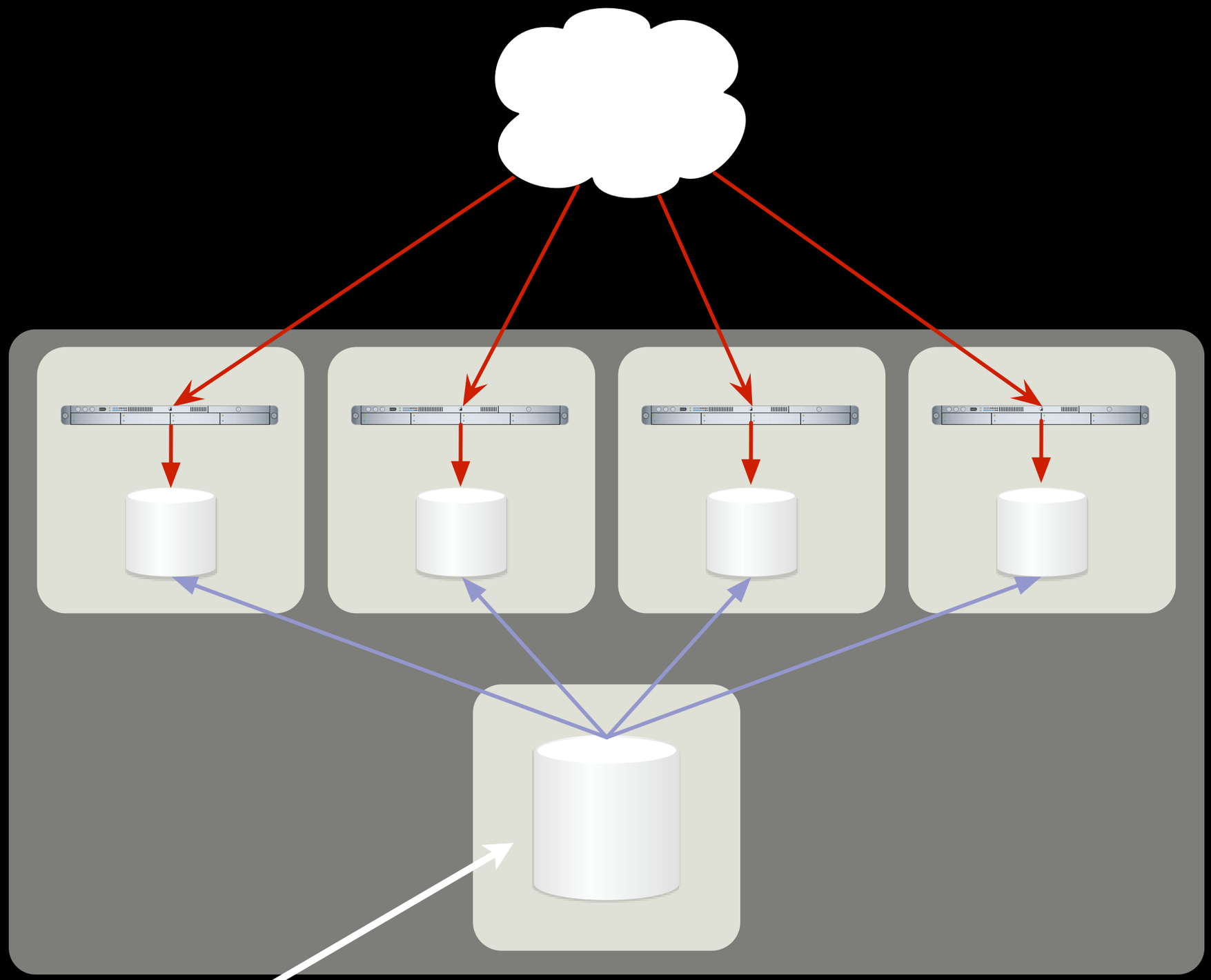
Media
- **NBA Highlights**
- **View Slideshow** NEW!
- Sports Talk Radio
- Photo Gallery

Front-End

Slave Database

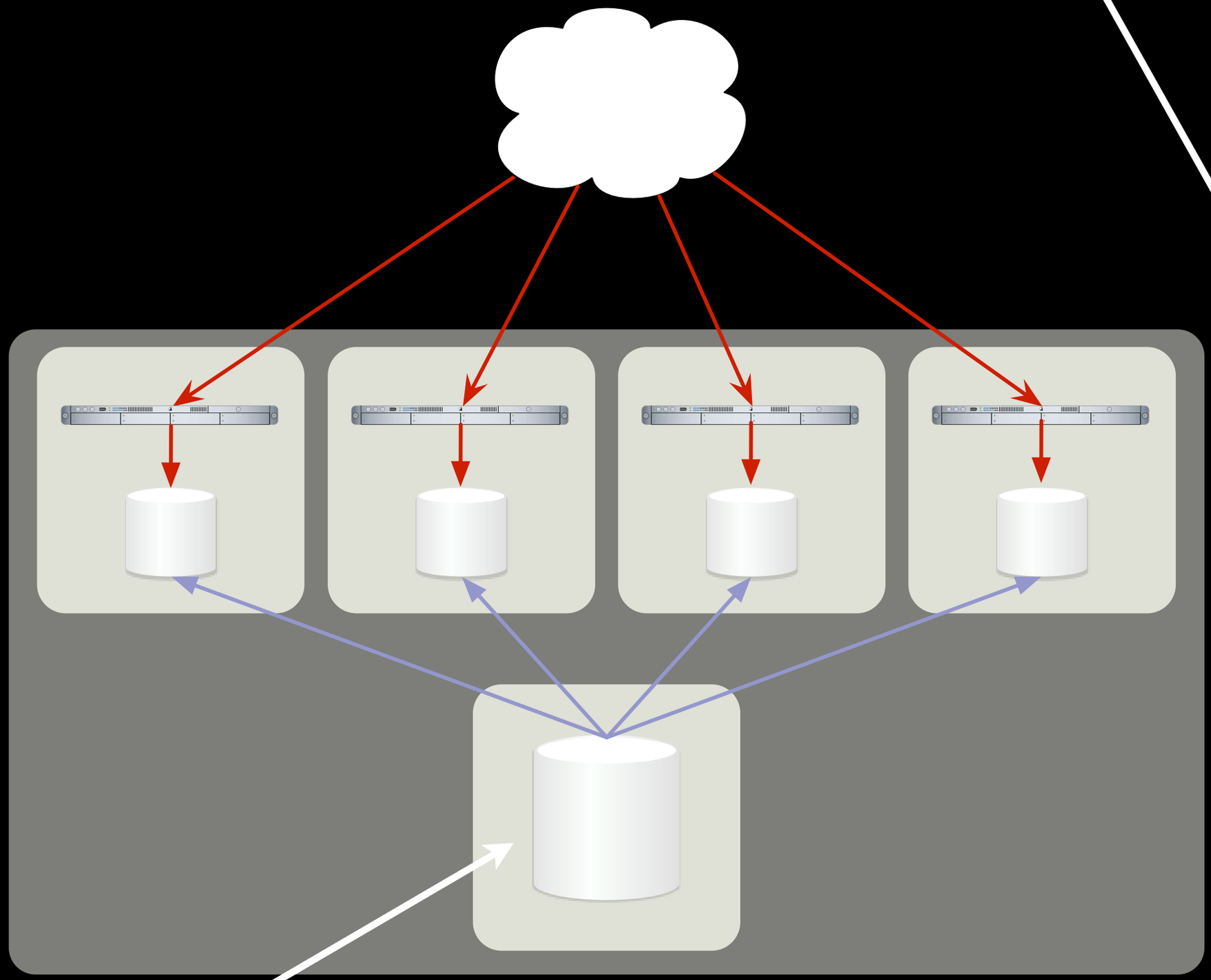
Master Database





Large Datasets Don't Push Well

Adding Capacity is Expensive



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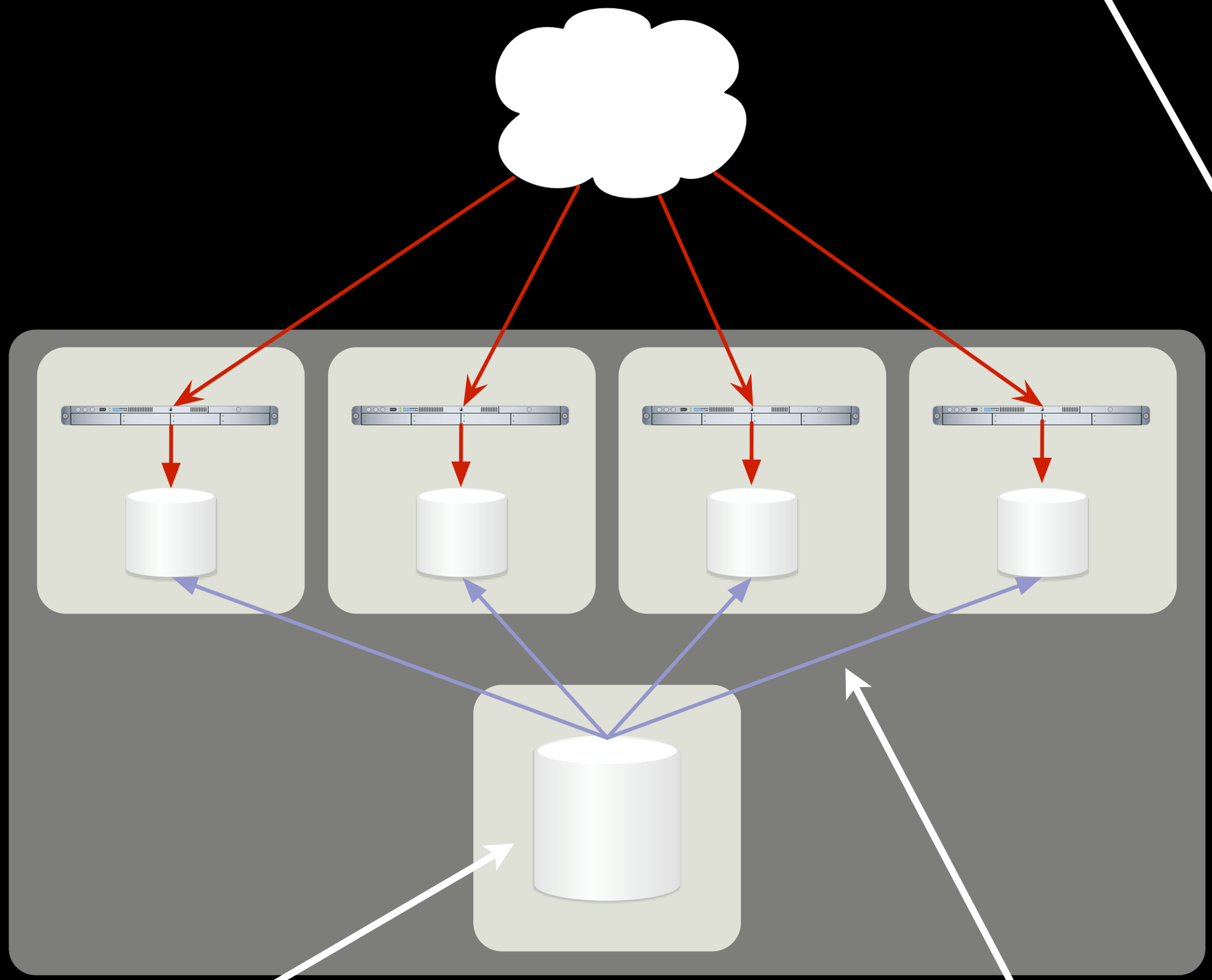
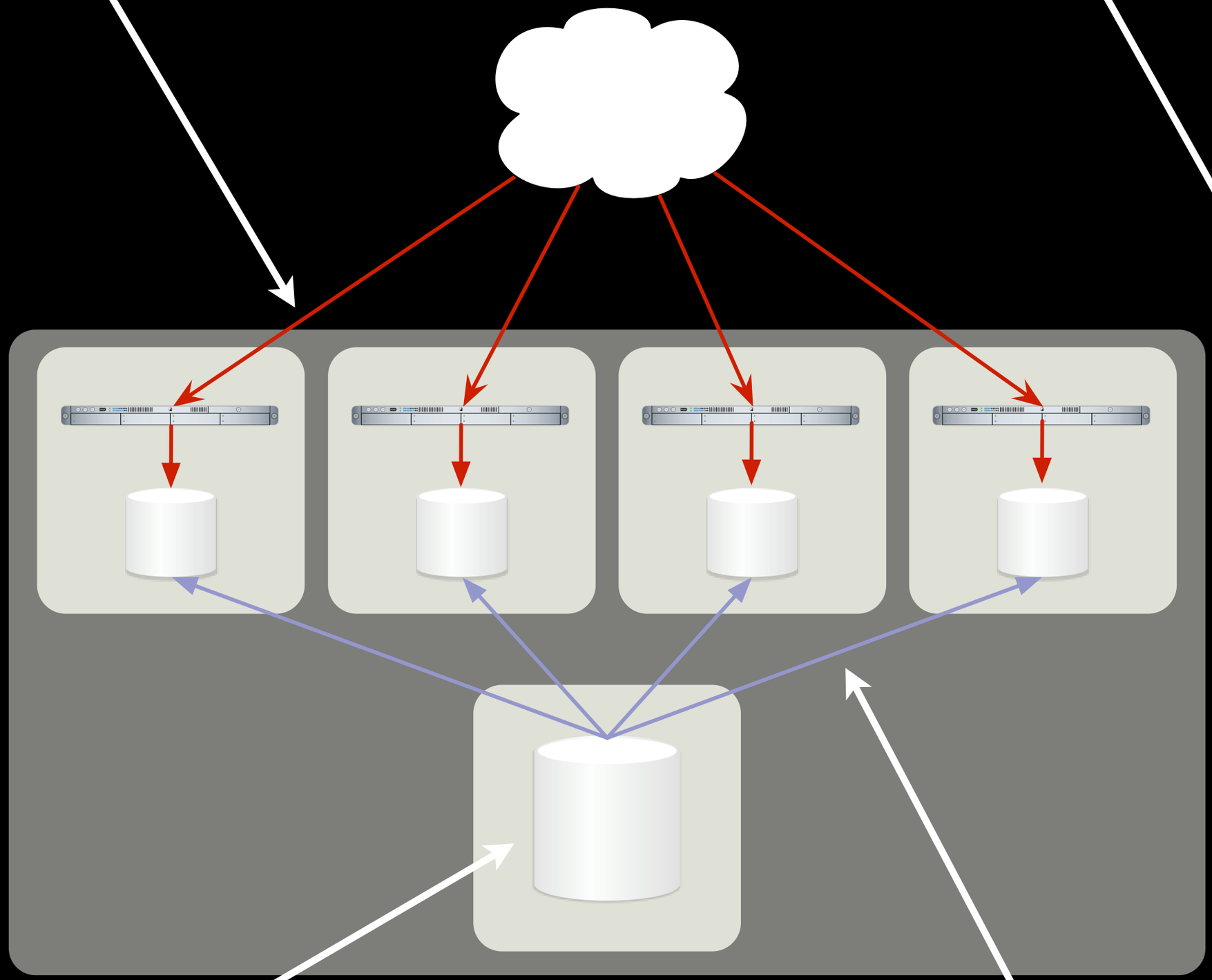


Large Datasets Don't Push Well

What to do after push failure?

User-Generated Content

Adding Capacity is Expensive



Large Datasets Don't Push Well

What to do after push failure?

My Tech : Yahoo! Tech

http://tech.yahoo.com/my

Inquisitor

Yahoo! My Yahoo! Mail

YAHOO! TECH

Welcome, mnotting
[Sign Out, My Account]

Search the Web | Search

Tech Home - Help

Volunteer Abroad with GVI

Join over 60 volunteer abroad programs around the world from 1 to 28 weeks.

www.gviusa.com

HOME | ADVISORS | TECH SHOWS | MY TECH

Search Yahoo! Tech: SEARCH

My Tech

My Saved Tech Products

Select All | COMPARE PRODUCTS | EMAIL

? What's this?

Remove

Kodak EasyShare C875

Remove

Canon PowerShot SD500 Digital ELPH

Remove

Apple MacBook Pro

Remove

Samsung BlackJack SGH i607

Find all your shopping lists at Yahoo! Shopping.

Questions I've Asked

Q How do I sync a SonyEricsson k610i to a Mac?

A No answers yet

To see your Questions and Answers in other categories, visit Yahoo! Answers.

Questions I've Answered

Q Me and my friend have a Sony Ericsson W850I. I am orange he is on t-mobile. why are are menu items differant?

A 2 Answers

No Products In List

MY TECH

mnotting

MORE MY TECH

My Product Ratings & Reviews

My Saved Tech Products

ADD A PRODUCT | ADD A PRODUCT | ADD A PRODUCT

ADD A PRODUCT | ADD A PRODUCT | ADD A PRODUCT

QUICK COMPARE | SHOW ALL

Gadgets You Might Like

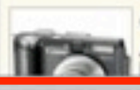
Why was I recommended these gadgets?

Samsung Trace Cell Phone

USER RATING

Syntax Olevia 542I Television

USER RATING



Canon PowerShot A640 Digital Camera

USER RATING

Loading "http://tech.yahoo.com/my;_ylt=AkiQmC4mUQs_La9bLq5TQ98HLZA5", completed 63 of 64 items

Pipes: editing 'eBay Price Watch'

http://pipes.yahoo.com/pipes/pipe.edit?_id=avkEShi32xG_EF6KZVUMqA

Inquisitor

pipes | eBay Price Watch

Search for pipes and feeds

Layout | Expand All | Collapse All

Back to My Pipes | New | Save a copy

- Sources
  - Yahoo! Search
  - Yahoo! Local
  - Fetch
  - Google Base
  - Flickr
- User inputs
- Operators
- Url
- String
- Date
- My pipes

Search For (text)

Name: textinput1
Prompt: Search For
Position: 1
Default: curta calculator
Debug: curta calculator

URLBuilder

Base: http://rss.api.ebay.c

Path elements

Query parameters

FeedNa	:	SearchResults
siteId	:	0
languag	:	en US
output	:	RSS20
satitle	:	
from	:	R8
submits	:	Search

Fetch

URL

url

Priced Above (enter 2

Name: textinput3
Prompt: Priced Above (enter
Position: 2
Default: 20000
Debug: 20000

Priced Below (enter 2

Name: textinput2
Prompt: Priced Below (enter
Position: 3
Default: 100000
Debug: 100000

About this Pipe

eBay Price Watch

This pipe is designed to use eBay's RSS API to find items within a certain price range.

To do this we use the URLBuilder module to create a query. You can cut and paste REST urls into the "Base" field of URLBuilder and it will extract the key vallue pairs for you. We then wire a TextInput the the 'satitle' field so that the user's input will be supplied as the query term to eBay.

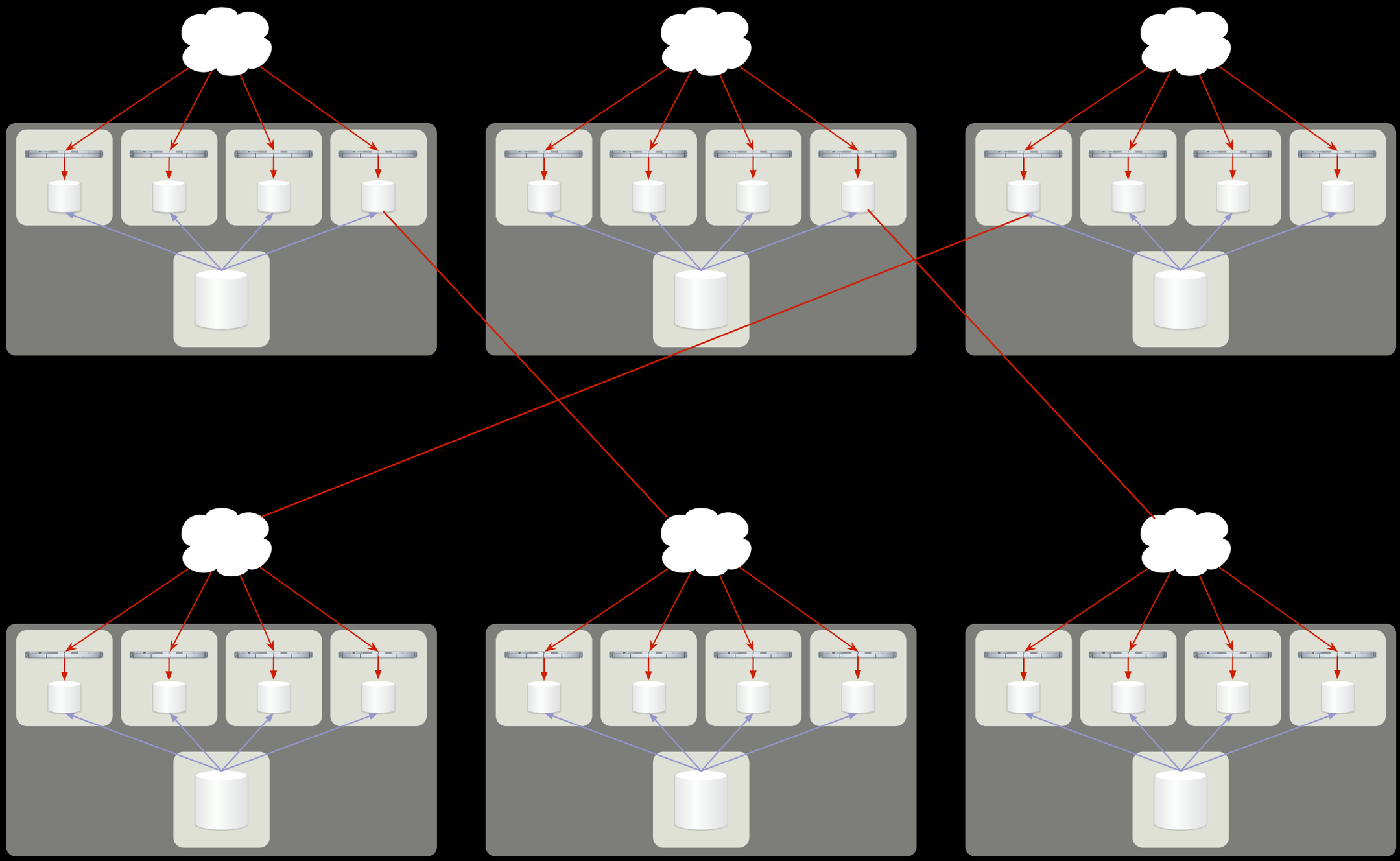
eBay supplements their RSS responses with a number of extensions. All of these are available to you to use in other modules. To filter on price, we use a Filter module and add two rules. In this example, we use 2 TextInputs to allow the user to set a minimum and maximum price range to filter the results.

You can make a copy of this Pipe right here to play with or try running the pipe.

OK

Debugger: *none*

Building New Sites



Requirements

Requirements

massive scalability
flexible deployment
highly dynamic
separation of concerns
mashability

i.e.,

Services

Scalability

Simplicity

Reuse

Interoperability

i.e.,

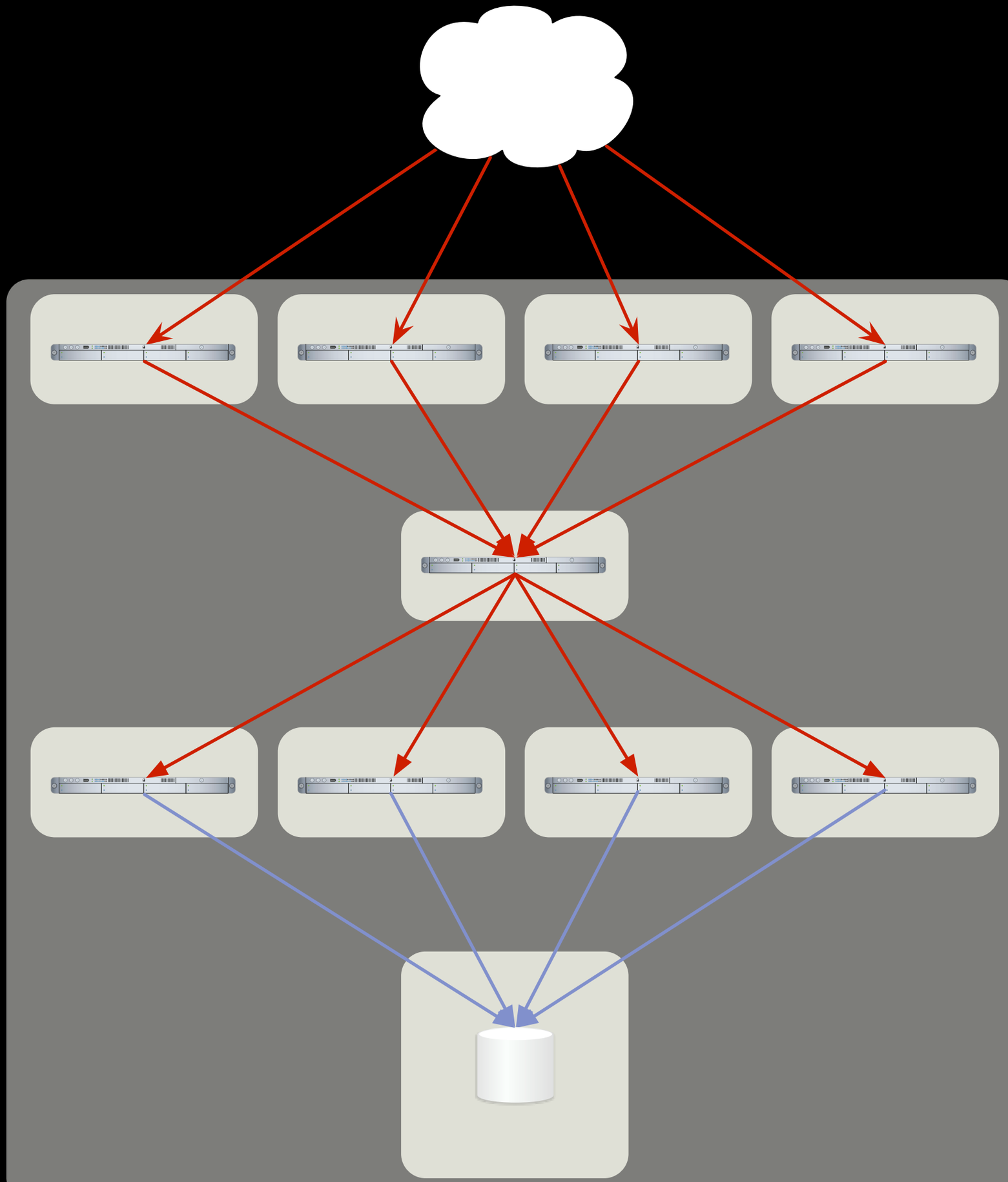
HTTP

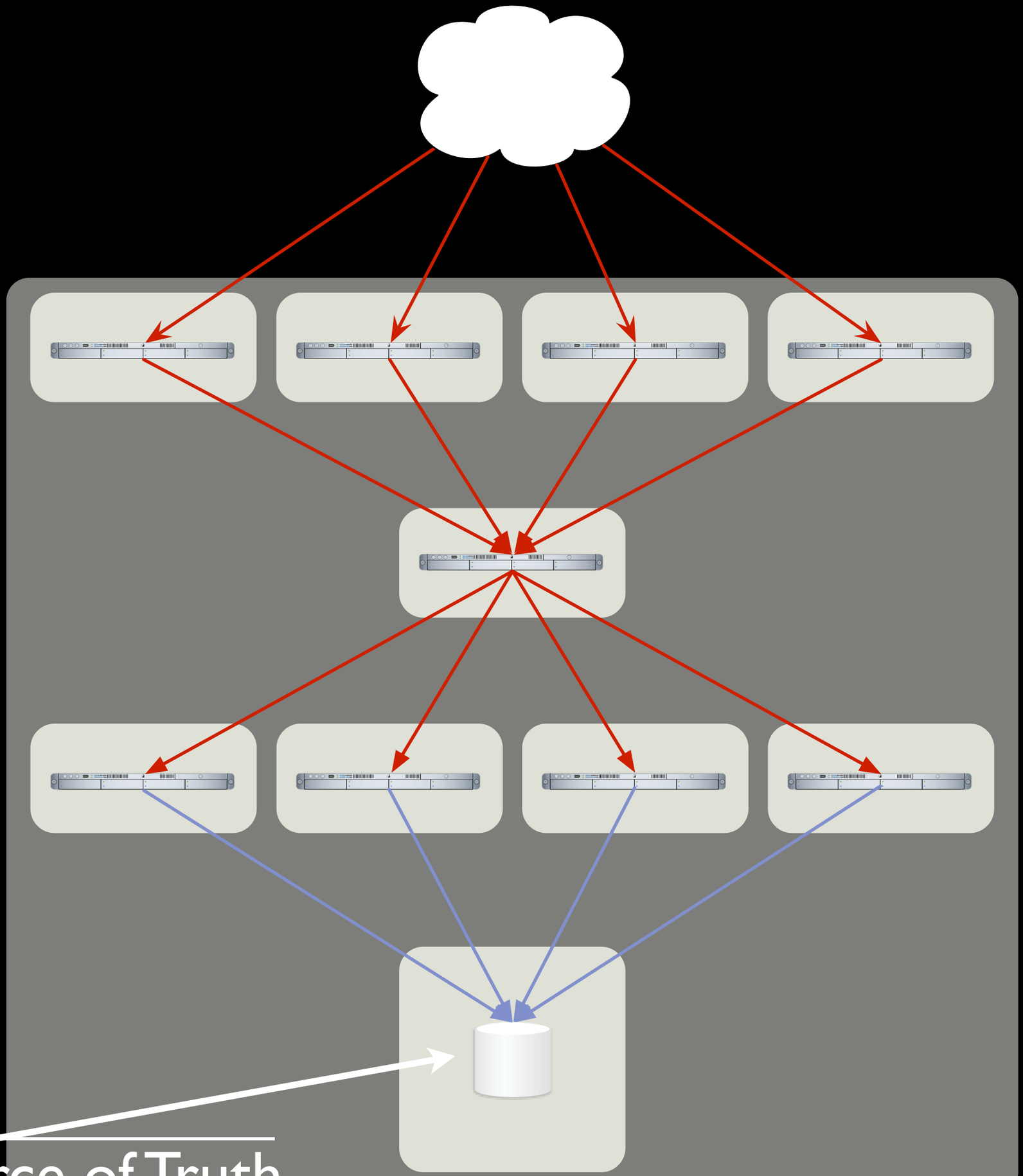
Front-End

Caching

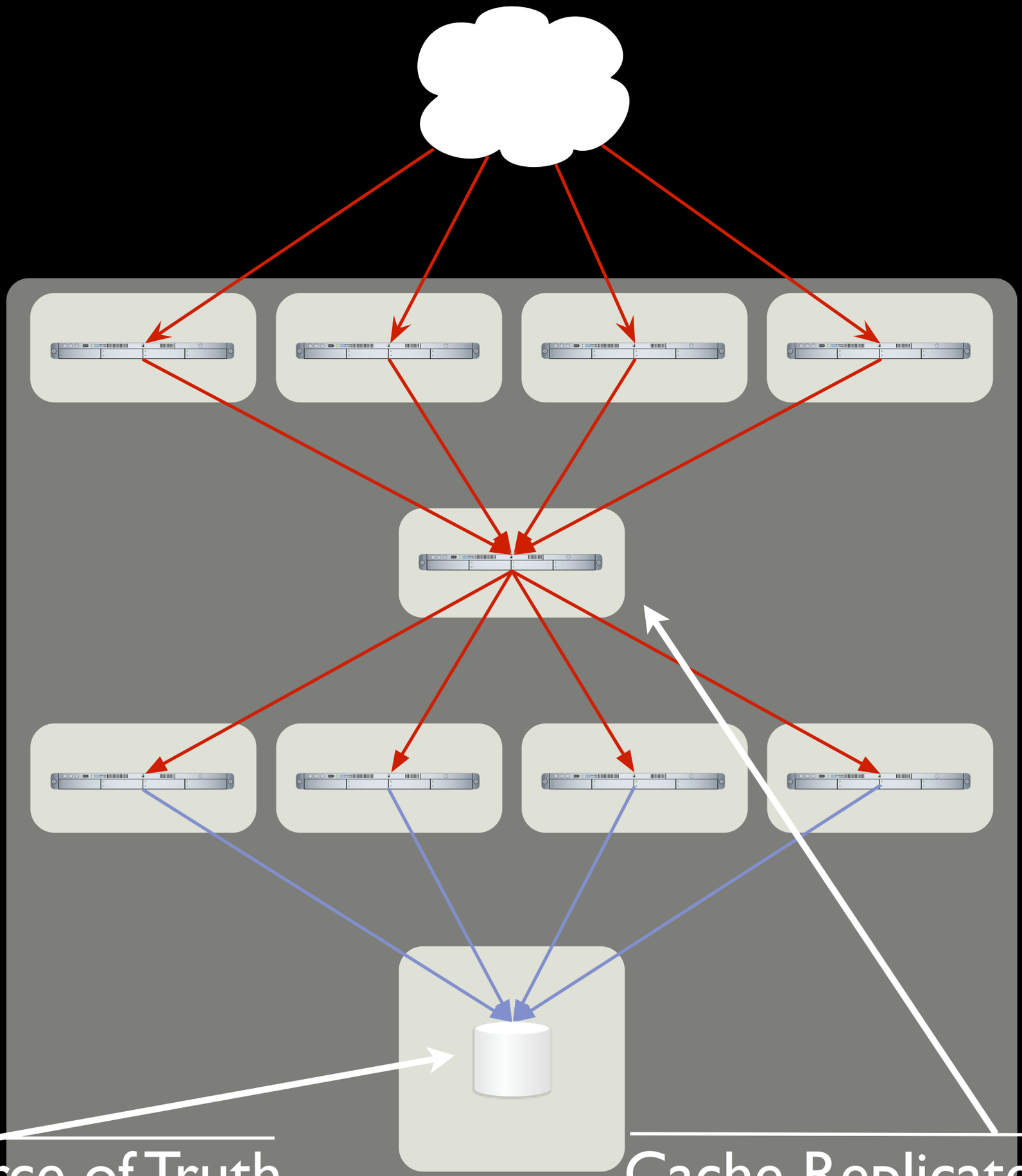
Back-End

Database

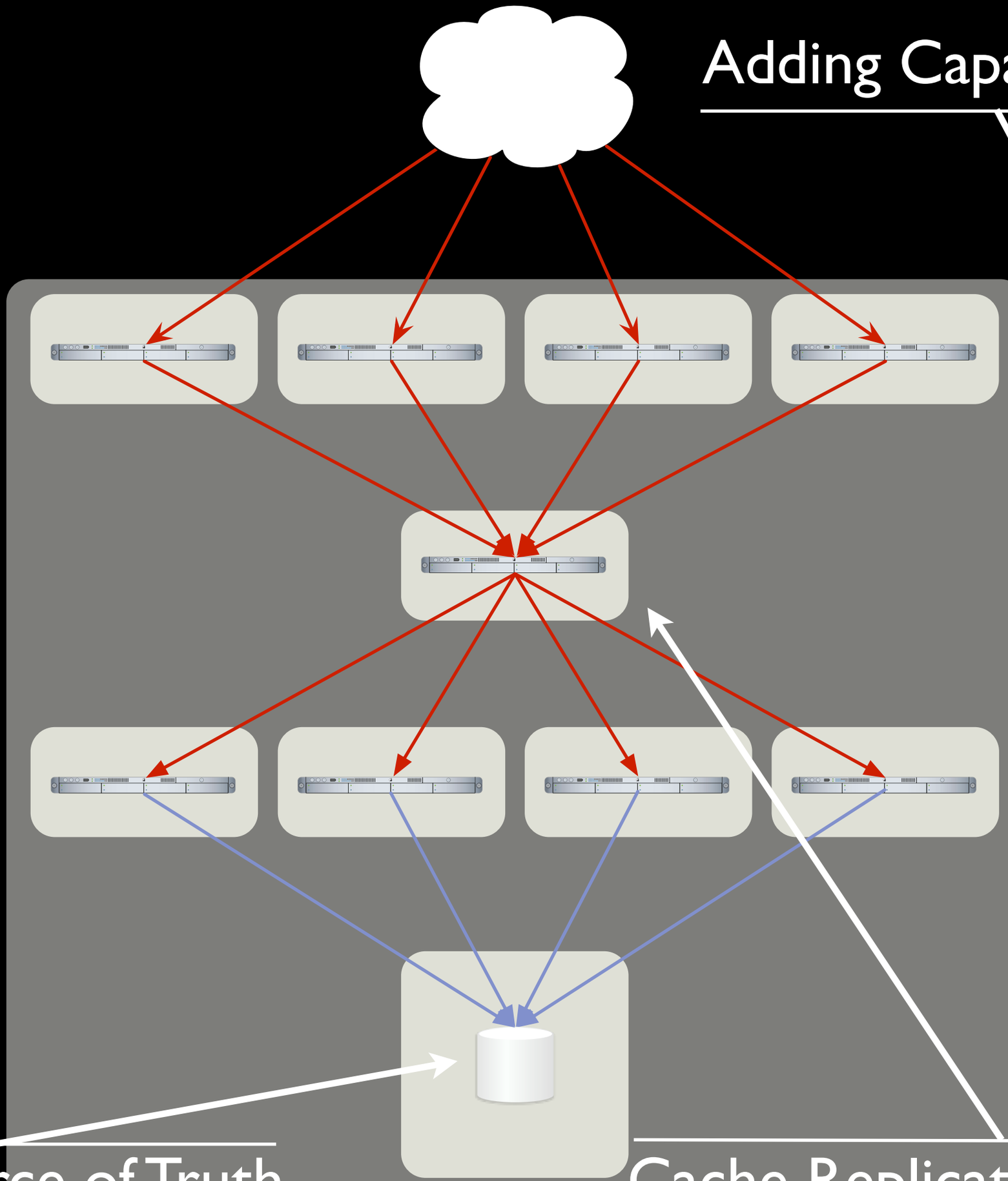




Single Source of Truth


Single Source of Truth
Cache Replicates Naturally

Adding Capacity Is Easy

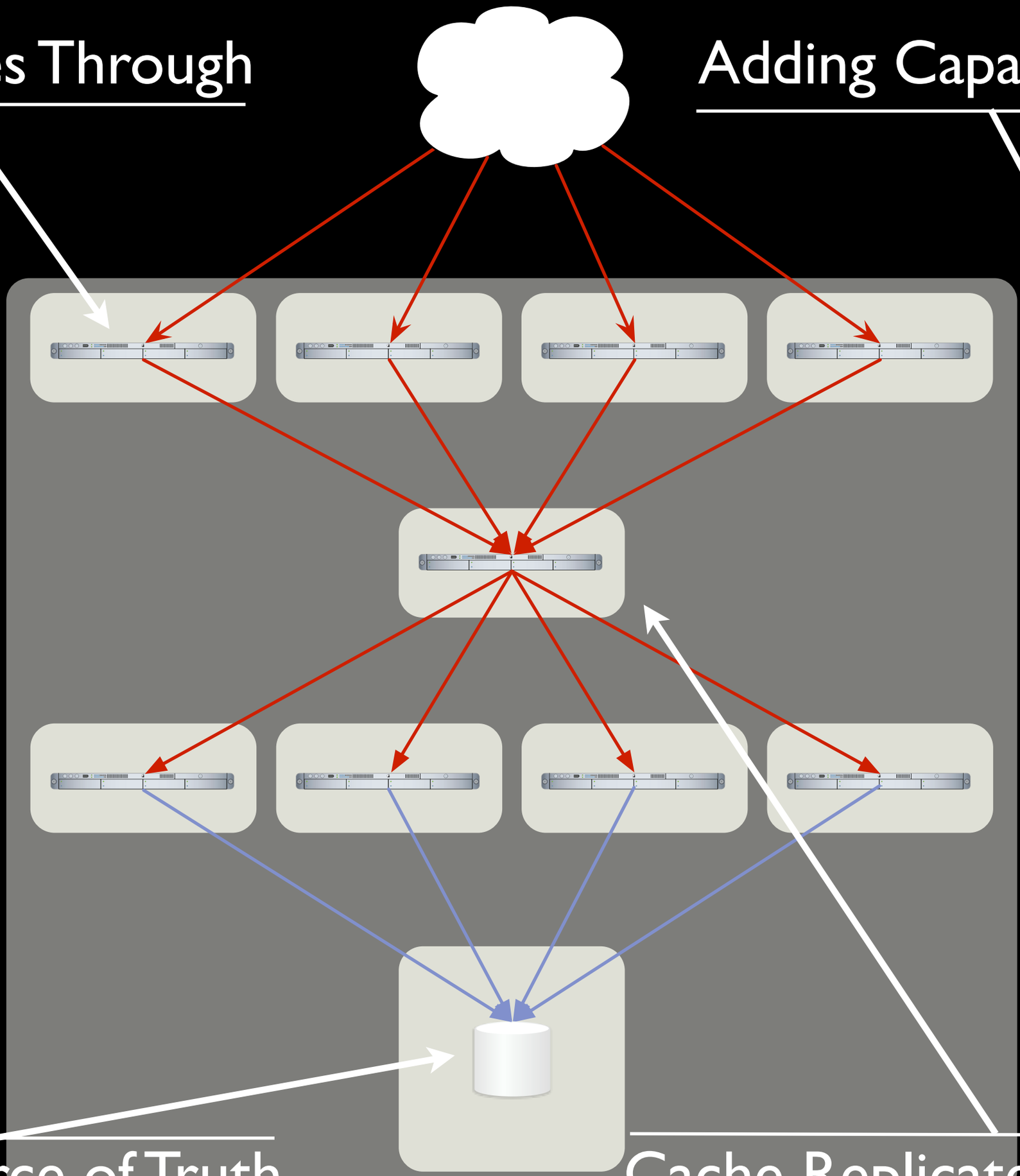


Single Source of Truth

Cache Replicates Naturally

UGC Pushes Through

Adding Capacity Is Easy



Single Source of Truth

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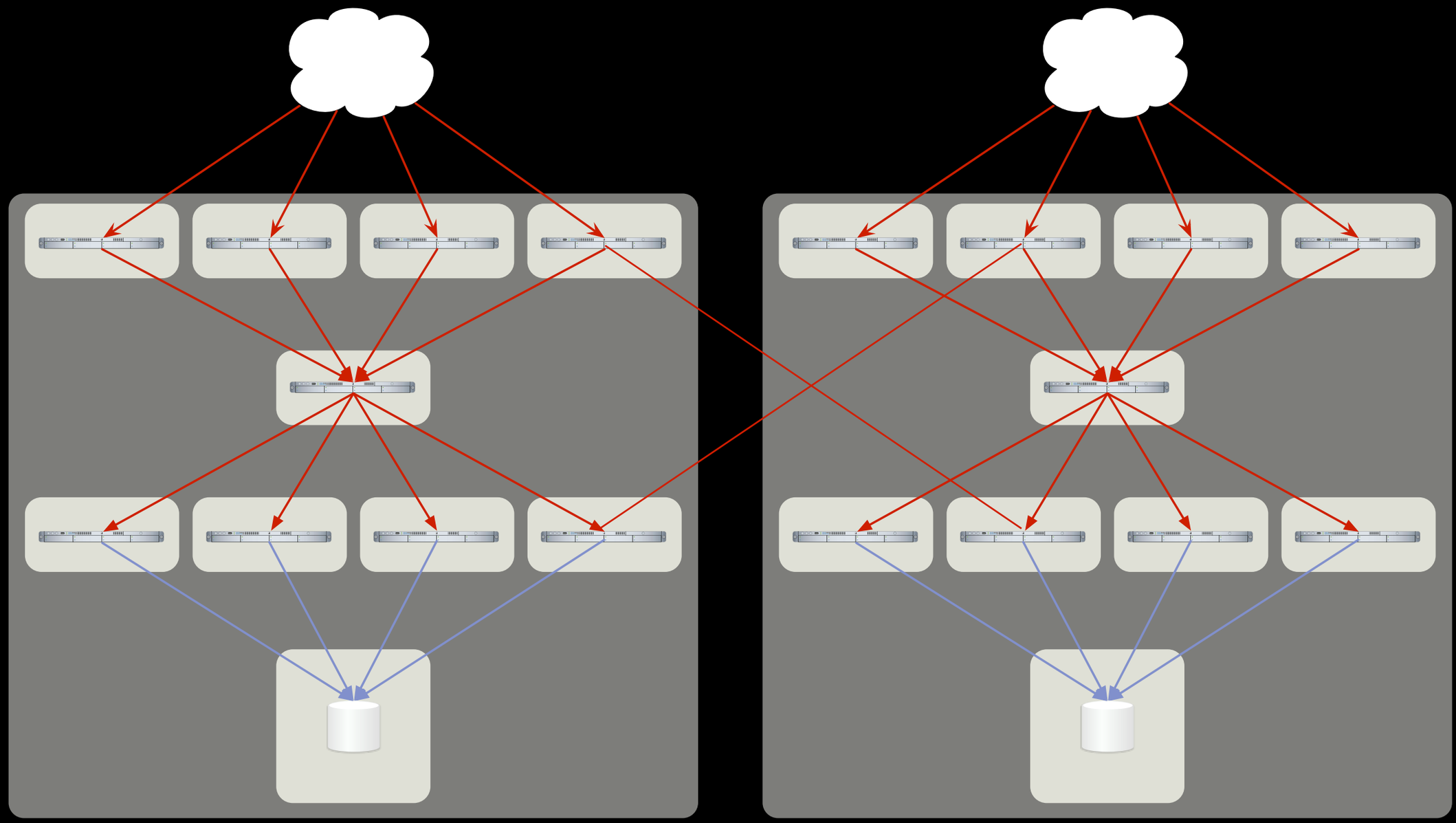
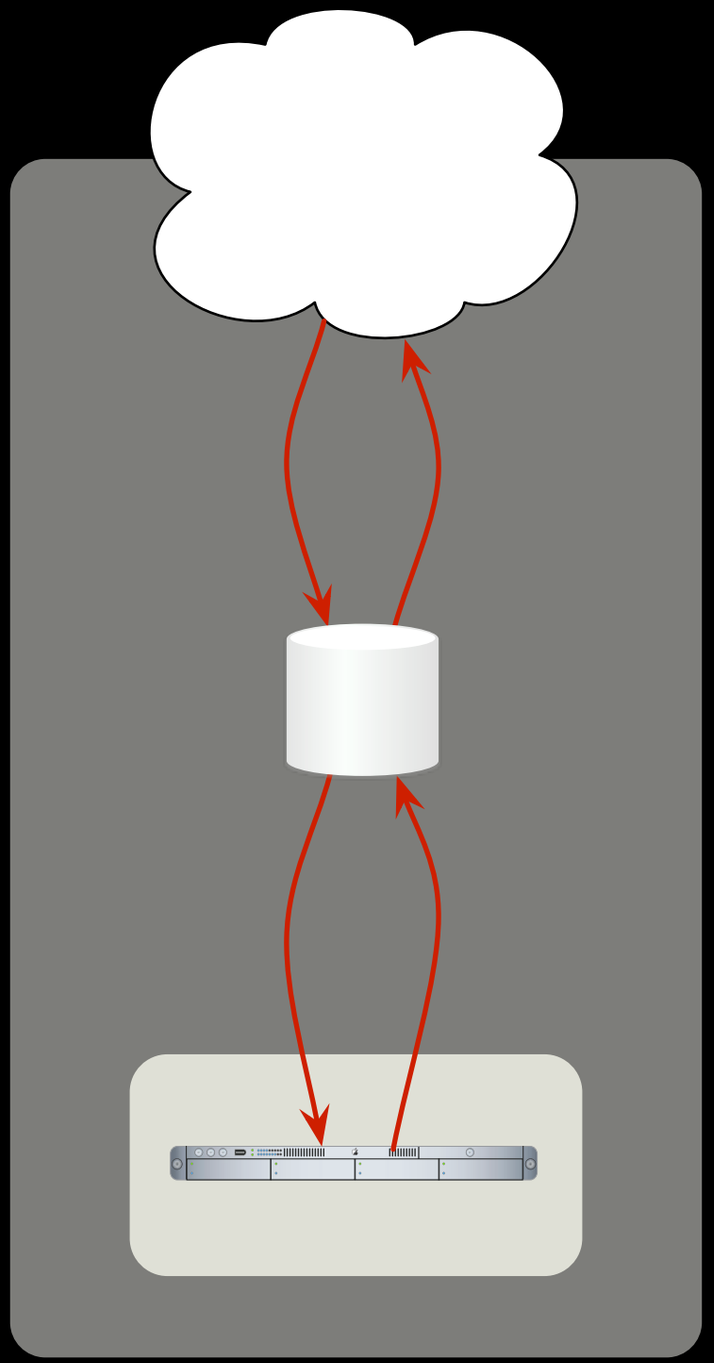
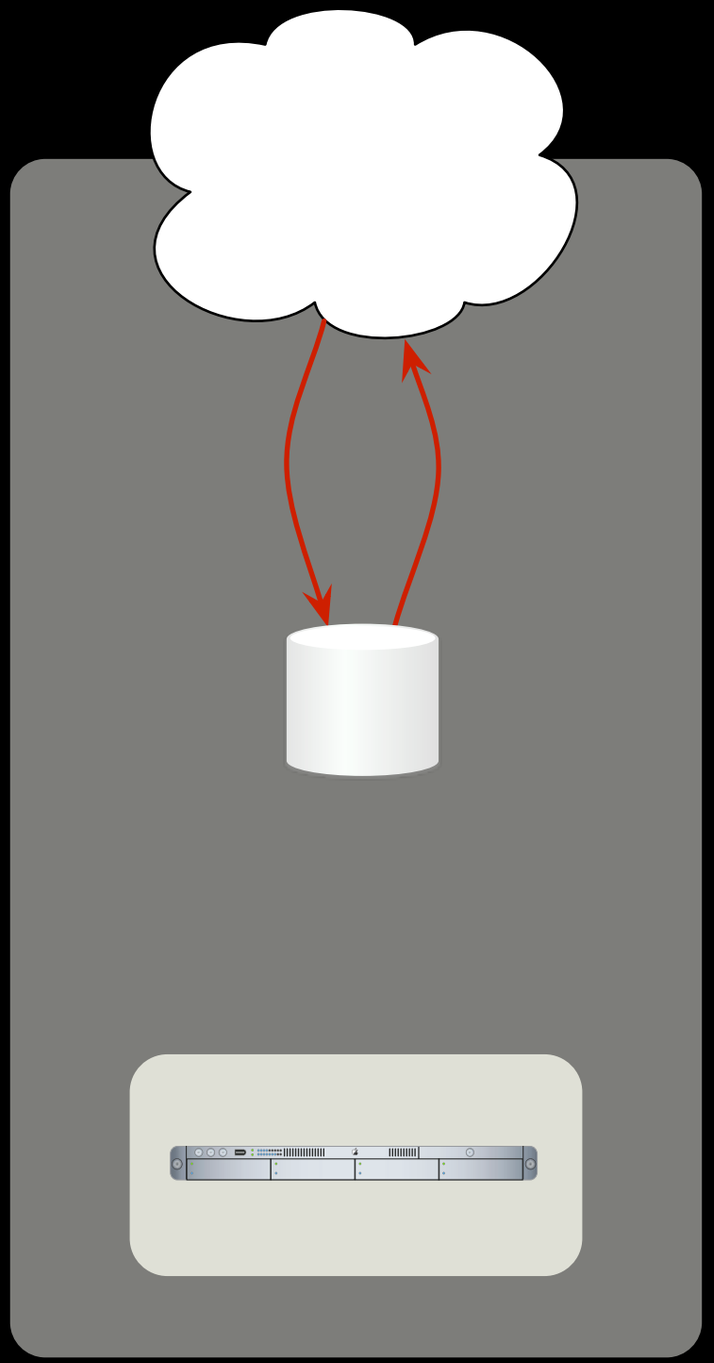


HTTP Caching Intermediaries



HTTP Caching Intermediaries

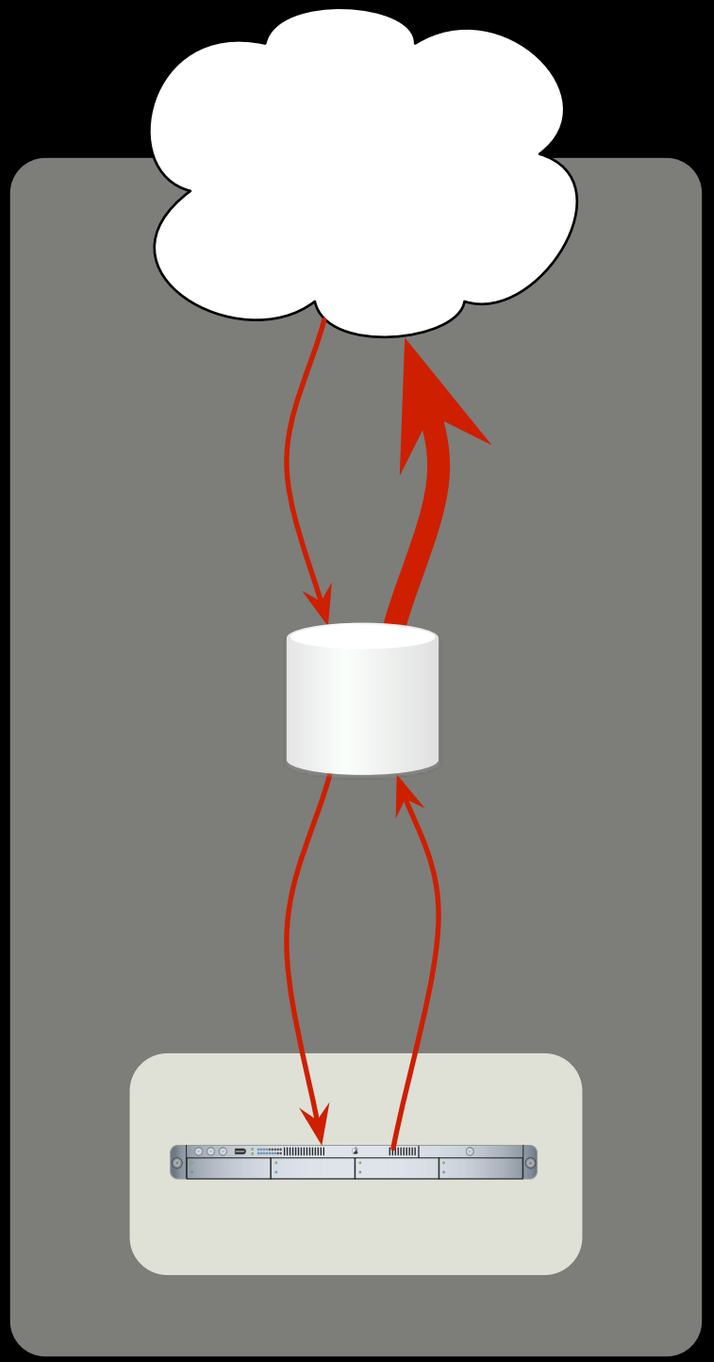
Freshness



HTTP Caching Intermediaries

Freshness

Validation

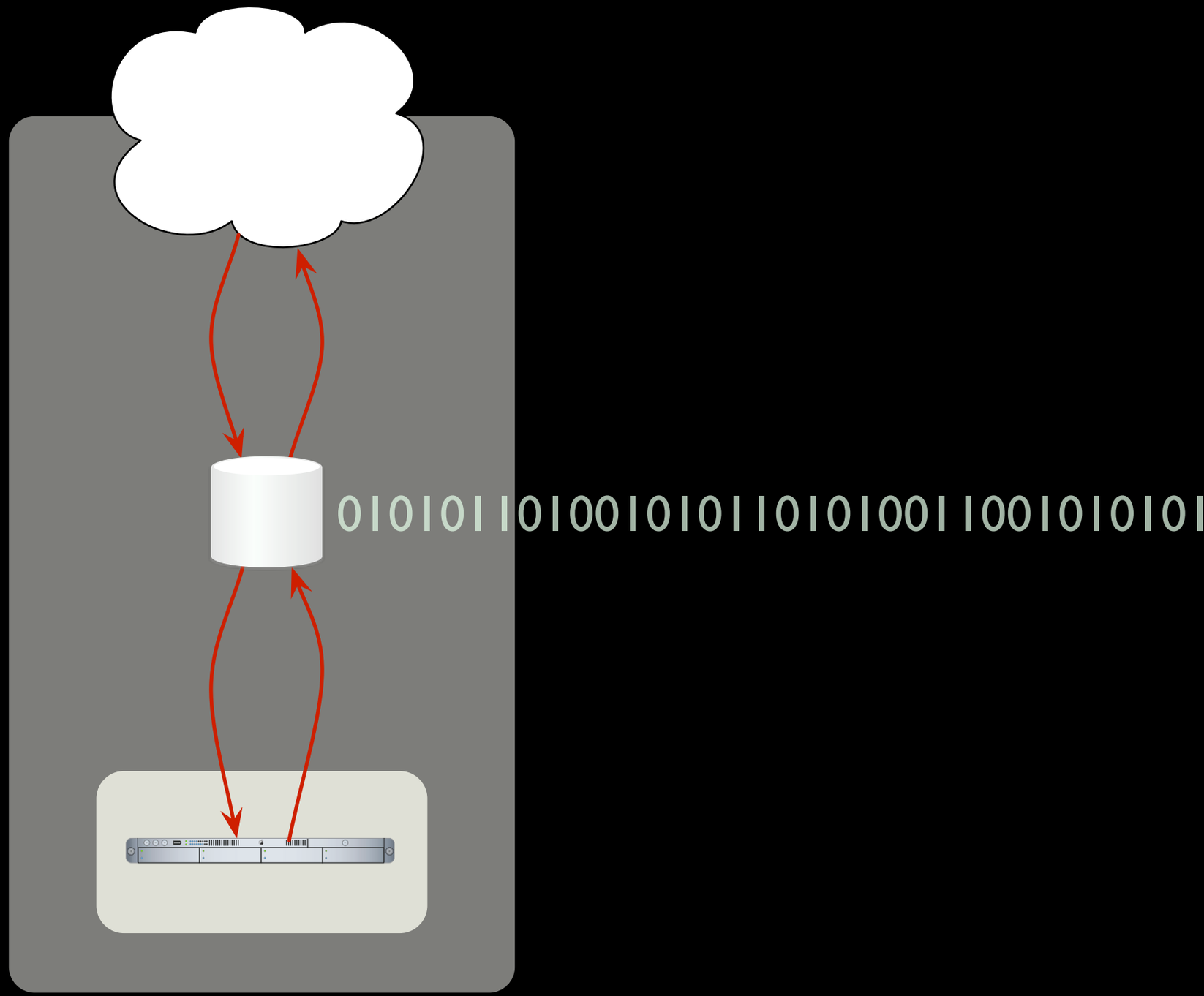


HTTP Caching Intermediaries

Freshness

Validation

Metrics



Service response times by cache result code

- 100019 log lines analysed, 0 parsing errors
- Start: Fri Sep 8 20:37:49 2006
- End: Fri Sep 8 21:14:30 2006
- 6445 distinct URLs seen, showing top 100

Response time histograms are a one-second window. See also Squid's result code documentation.

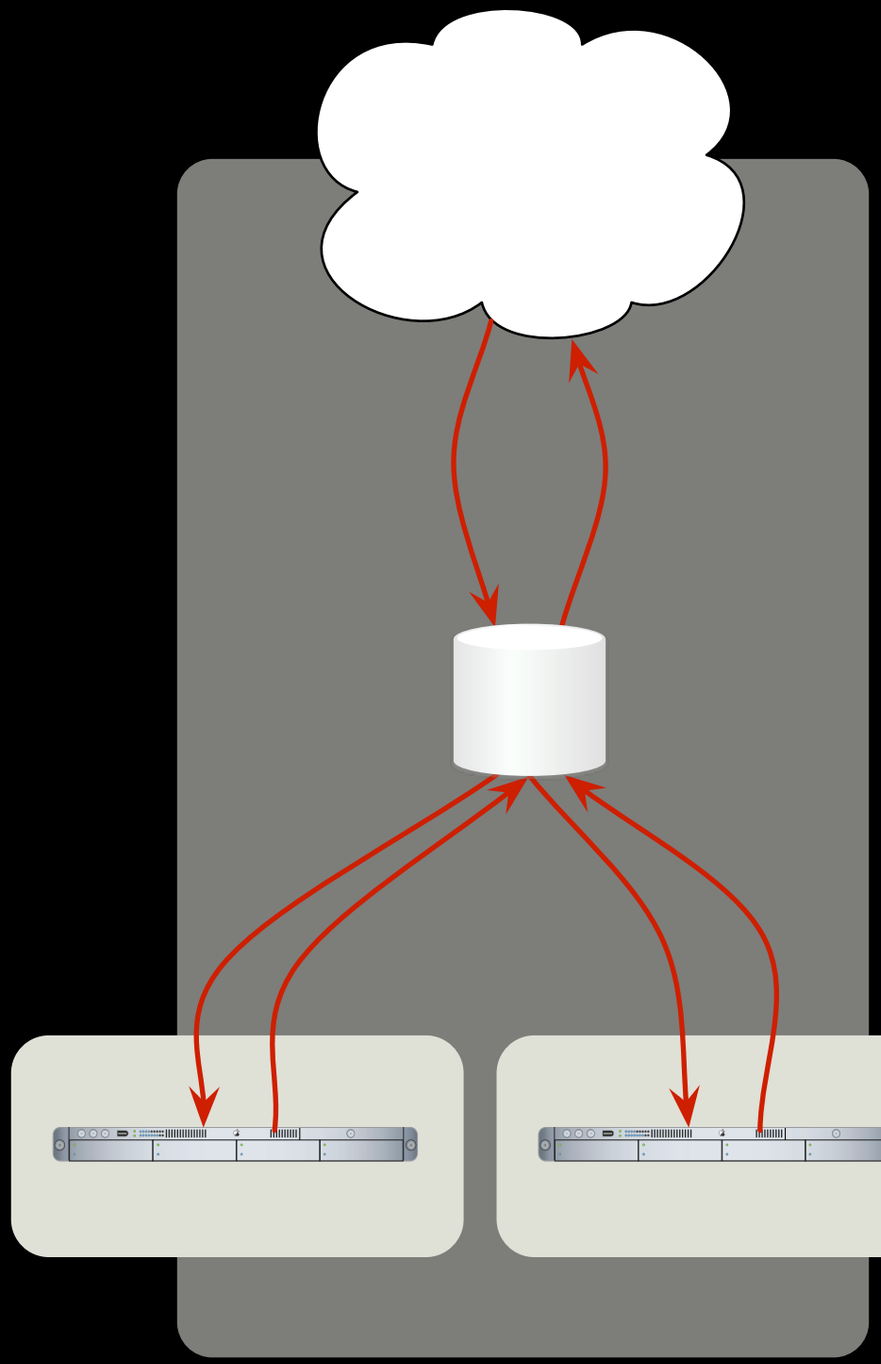
url	accesses	CLIENT_REFRESH_MISS	HIT	MEM_HIT	MISS	NEGATIVE_HIT	SWAP
[illegible]	13360	0%	0%	84%	10%	6%	0%
[illegible]	7935	0%	0%	40%	60%	0%	0%
[illegible]	7905	0%	0%	98%	1%	0%	0%
[illegible]	7171	0%	1%	73%	25%	0%	1%
[illegible]	6849	1%	0%	80%	18%	0%	1%
[illegible]	4201	0%	0%	100%	0%	0%	0%
[illegible]	3968	0%	0%	0%	93%	7%	0%
[illegible]	3957	0%	0%	100%	0%	0%	0%
[illegible]	3069	0%	0%	100%	0%	0%	0%
[illegible]	1505	0%	0%	90%	10%	0%	0%
[illegible]	1386	0%	0%	82%	17%	0%	0%
[illegible]	1236	0%	0%	0%	100%	0%	0%
[illegible]	1189	0%	0%	96%	4%	0%	0%
[illegible]	1039	0%	0%	94%	5%	0%	0%
[illegible]	1028	0%	0%	95%	5%	0%	0%
[illegible]	1018	1%	0%	75%	24%	0%	0%
[illegible]	996	0%	0%	0%	100%	0%	0%
[illegible]	799	1%	0%	66%	34%	0%	0%
[illegible]	787	1%	0%	75%	24%	0%	0%
[illegible]	699	0%	0%	99%	1%	0%	0%
[illegible]	684	0%	0%	100%	0%	0%	0%
[illegible]	658	0%	0%	100%	0%	0%	0%
[illegible]	551	0%	0%	0%	100%	0%	0%
[illegible]	524	0%	0%	98%	2%	0%	0%
[illegible]	503	28%	0%	54%	17%	0%	0%
url	accesses	CLIENT_REFRESH_MISS	HIT	MEM_HIT	MISS	NEGATIVE_HIT	SWAP

HTTP Caching Intermediaries

Freshness

Validation

Metrics



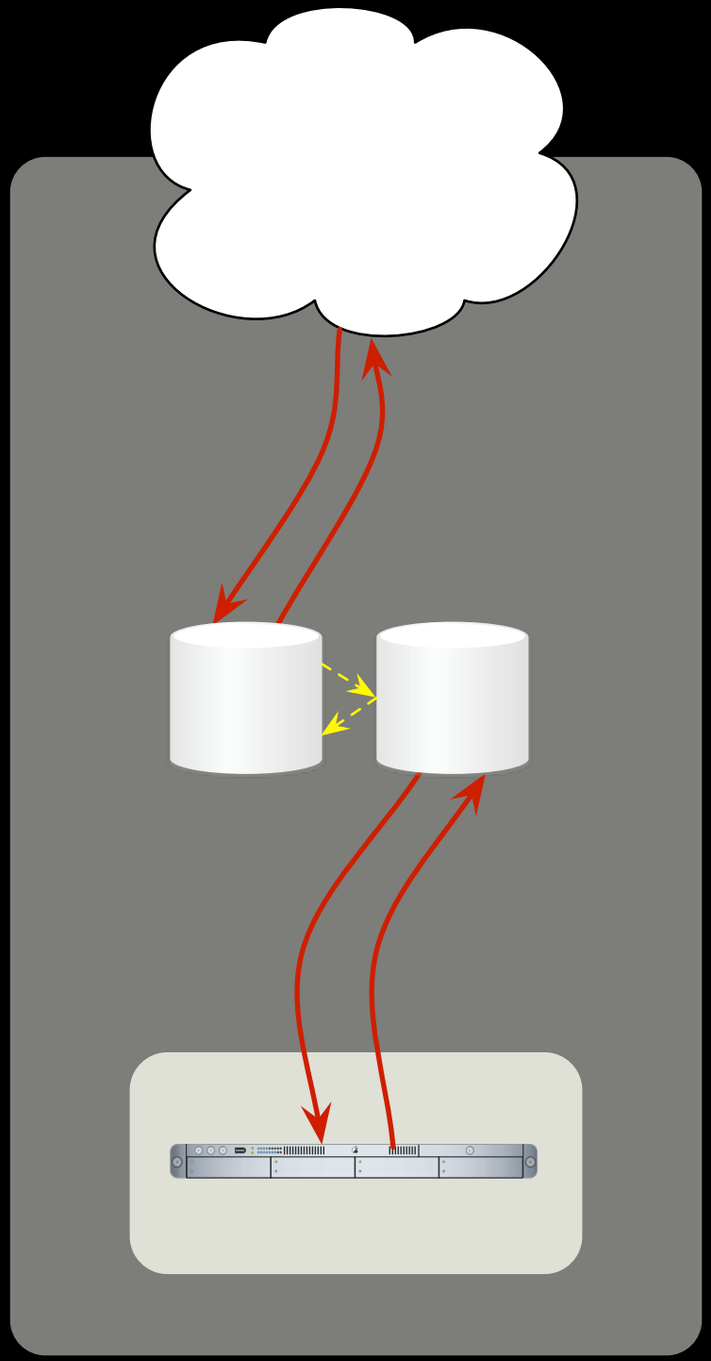
Load Balancing

HTTP Caching Intermediaries

Freshness

Validation

Metrics



Load Balancing

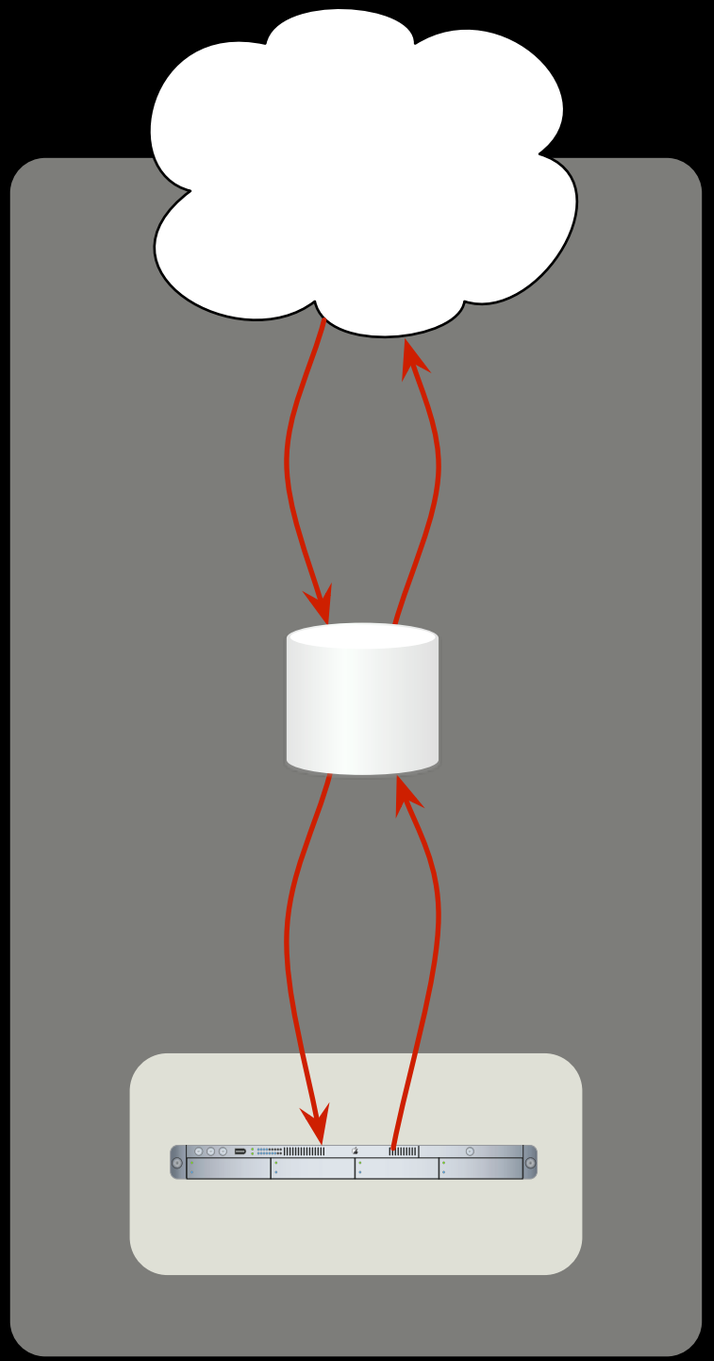
Cache Peering

HTTP Caching Intermediaries

Freshness

Validation

Metrics



Load Balancing

Cache Peering

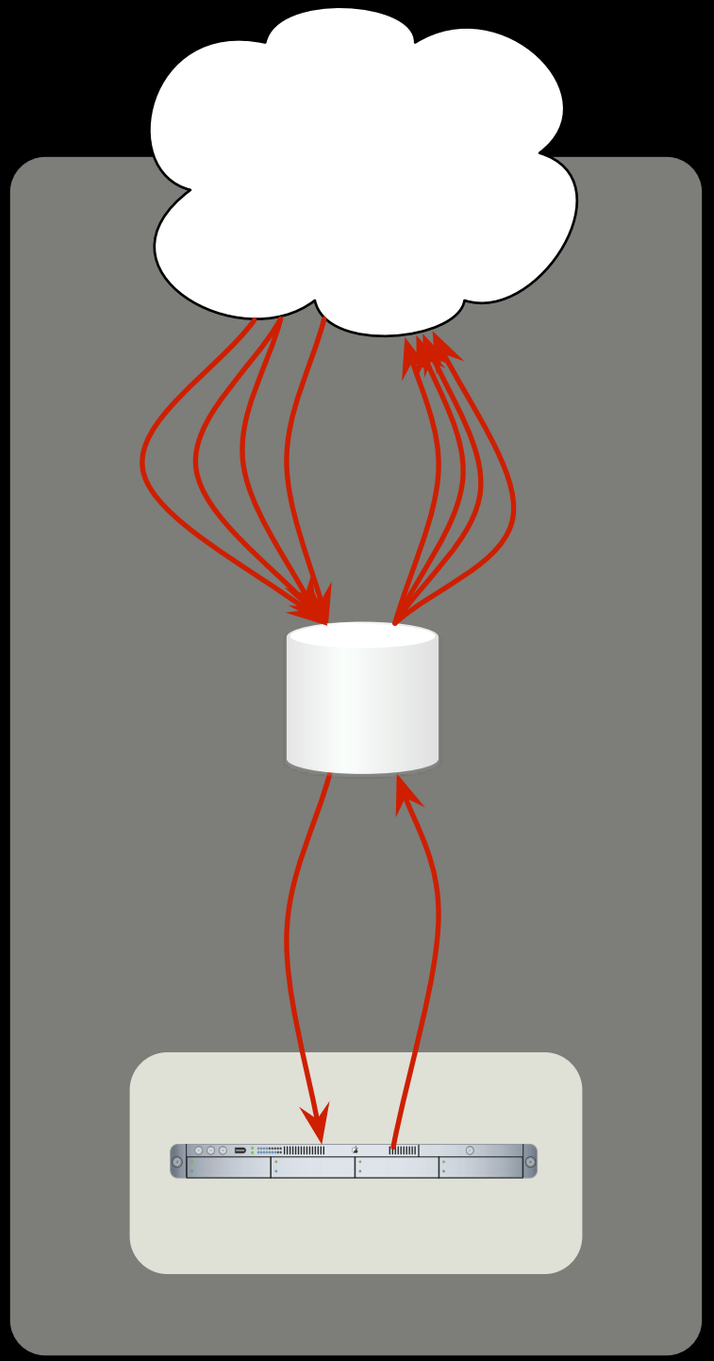
Negative Caching

HTTP Caching Intermediaries

Freshness

Validation

Metrics



Load Balancing

Cache Peering

Negative Caching

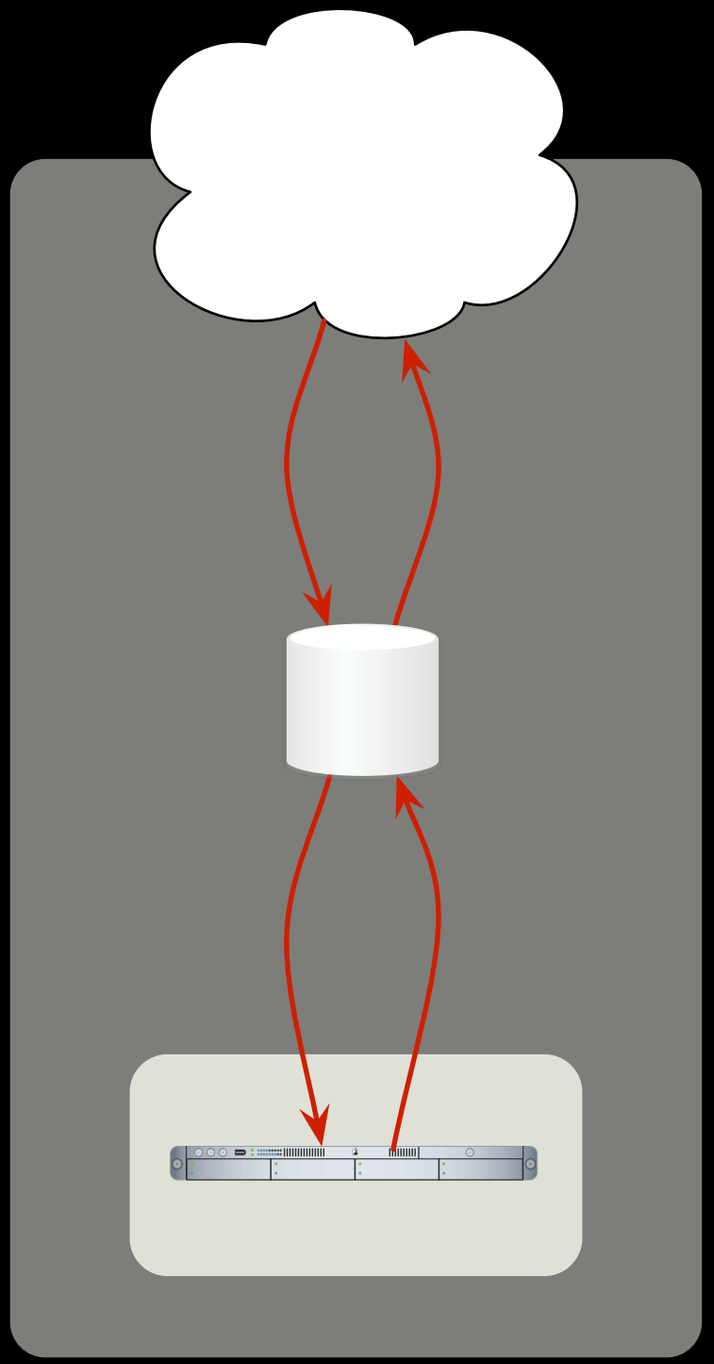
Collapsed Forwarding

HTTP Caching Intermediaries

Freshness

Validation

Metrics



Load Balancing

Cache Peering

Negative Caching

Collapsed Forwarding

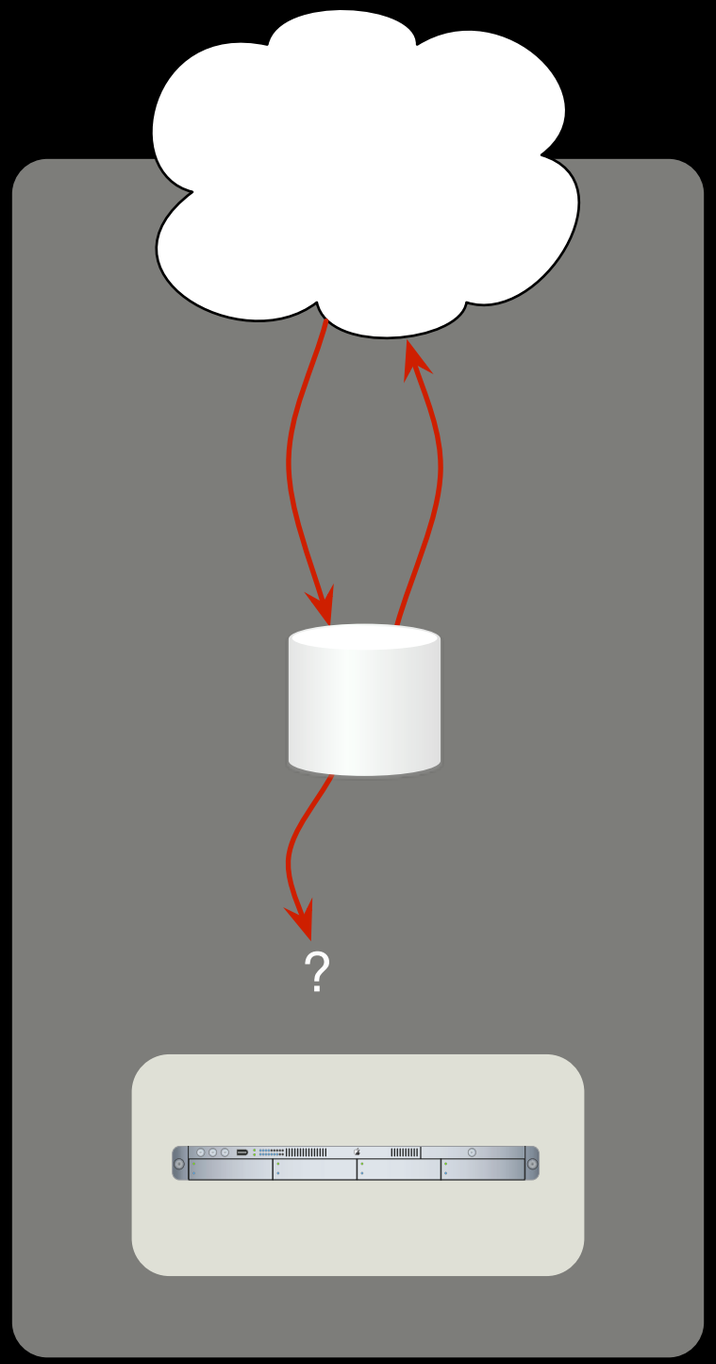
stale-while-revalidate

HTTP Caching Intermediaries

Freshness

Validation

Metrics



Load Balancing

Cache Peering

Negative Caching

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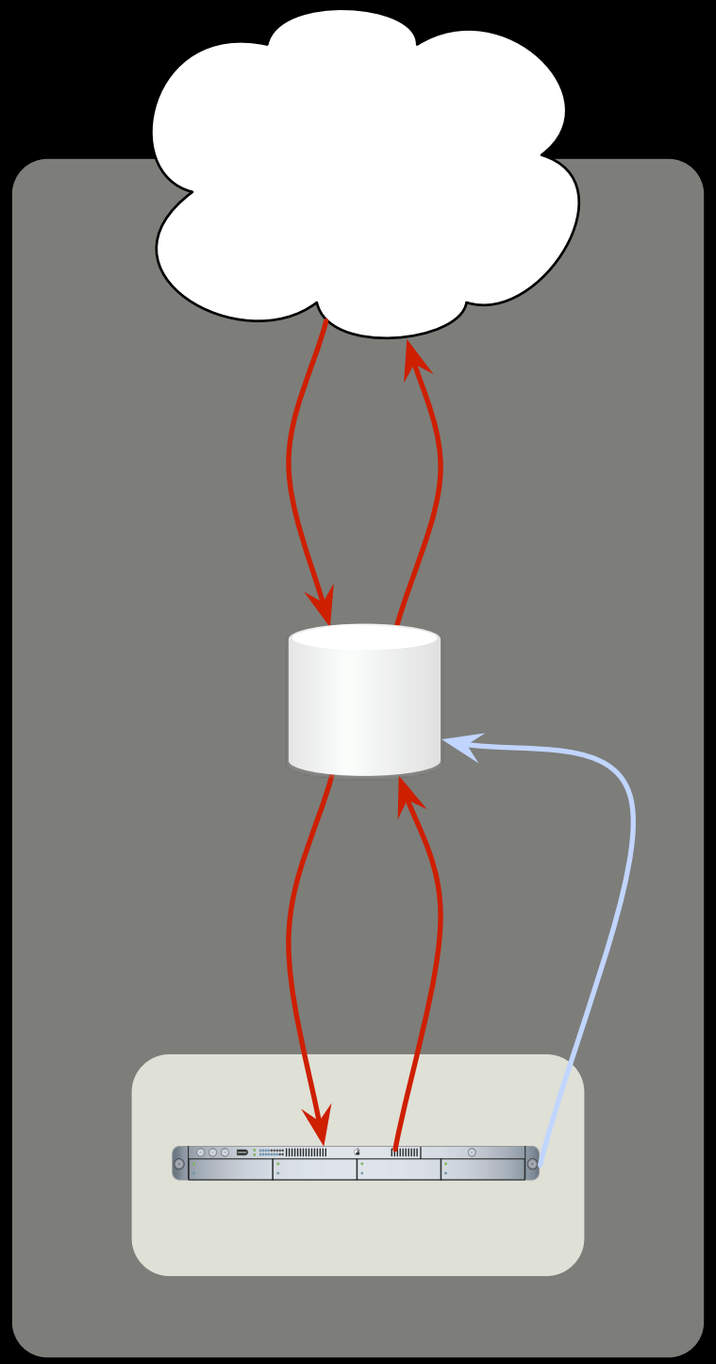

Load Balancing

Cache Peering

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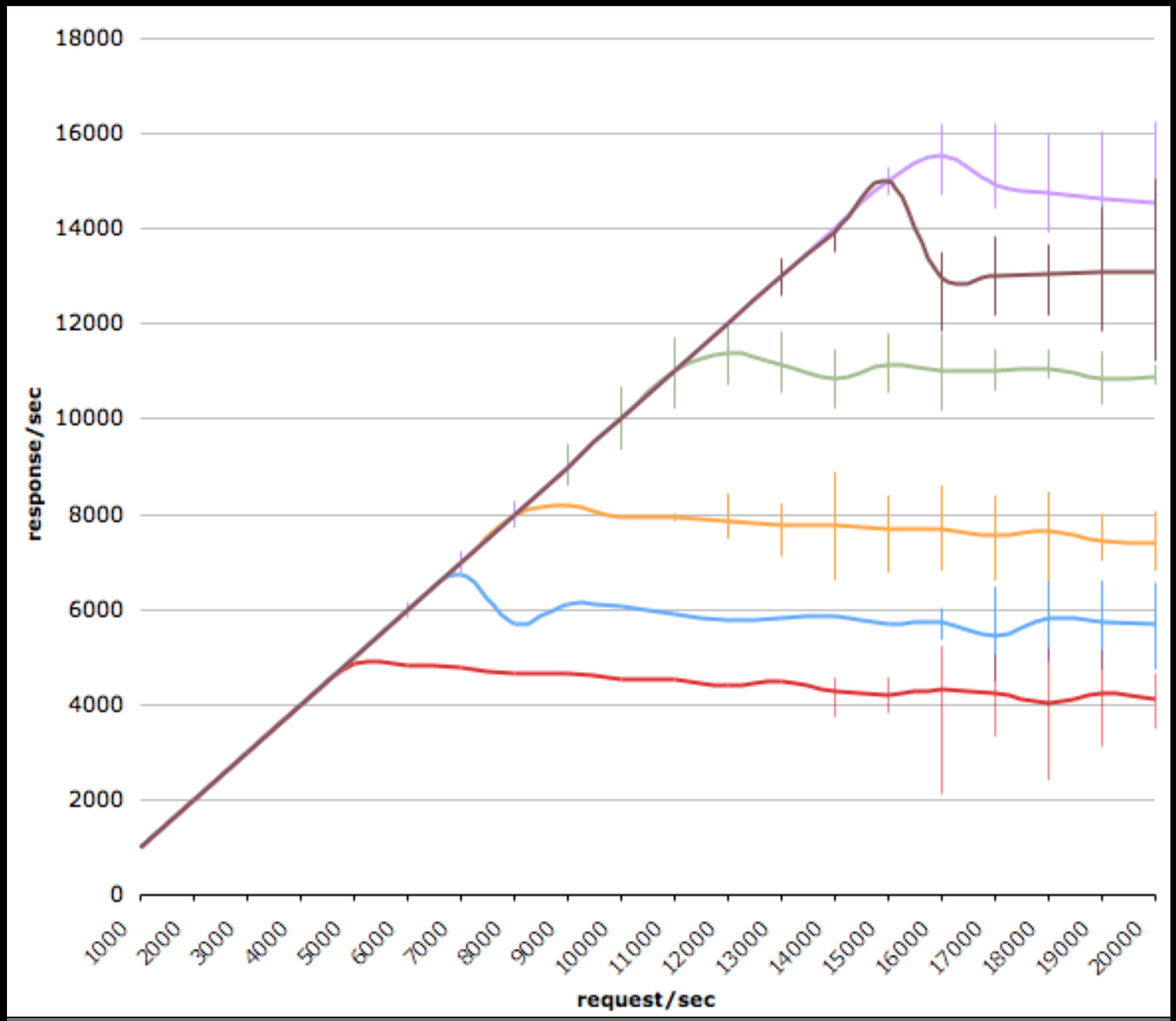
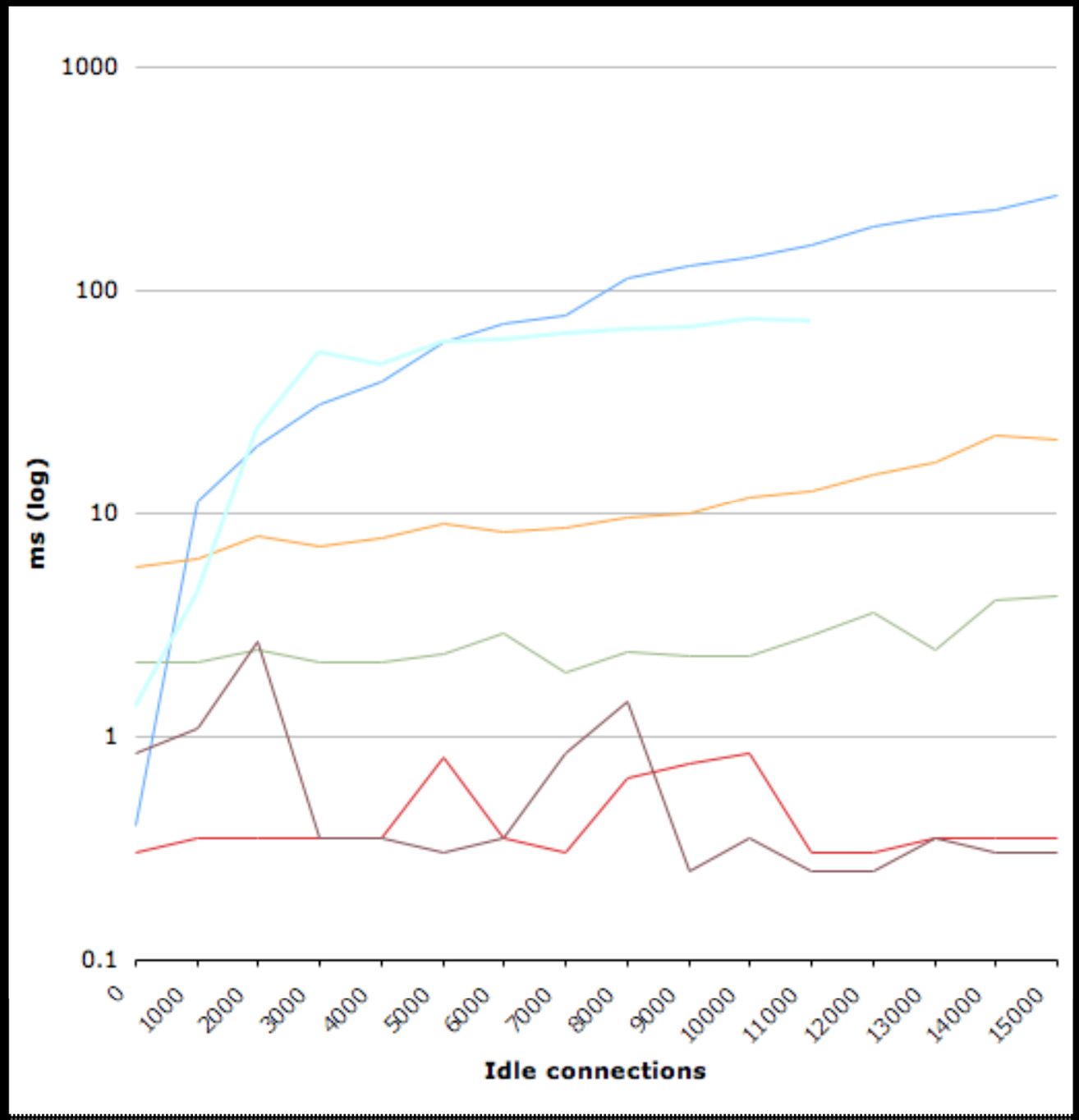
stale-if-error

Invalidation Channels

12,000 req/sec/core



Tens of Thousands of Connections



Squid

pitfalls

REST vs. WS-* wars
theory vs. practice
human-intuitive, but not programmer-intuitive
different deployment/operational concerns
formats are hard
format / interface proliferation
authentication isn't there yet
tools have a way to go

what's needed

tools
web description language
data-oriented schema language
investment in the Atom stack
HTTP test suite